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13. Abstract: Provides an analysis of FY'89 Records of Decision(RODs) conducted by the Office of Emergency and Remedial Response(OERR) and the Office of Waste Programs Enforcement(OWPE). This directive focuses on the consistency of remedy selection decisions with Superfund program expectations as established in the National Contingency Plan(NCP),and the quality of ROD documentation . The report highlights improvements in ROD quality and discusses trends over the past several years. The report also offers recommendations for strengthening RODs in the future.

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OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

OSWER Directive No. 9355.3-09

MEMORANDUM

SUBJECT: Results of FY'89 Record of Decision Analysis
Superfund Management Review Implementation Product -
Recommendation No. 25A

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

Bruce M. Diamond, Director
Office of Waste Programs Enforcement

TO: Director, Waste Management Division
Regions I, IV, V, VII, VIII
Director, Emergency and Remedial Response Division
Region II
Director, Hazardous Waste Management Division
Regions III, VI, IX
Director, Hazardous Waste Division
Region X

Purpose

The purpose of this memorandum is to transmit the results of the analysis of FY'89 Records of Decision (RODs) conducted by the Office of Emergency and Remedial Response (OERR) and the Office of Waste Programs Enforcement (OWPE). This report focuses on the consistency of remedy selection decisions with Superfund program expectations as established in the National Contingency Plan (NCP), and the quality of ROD documentation. The report highlights improvements in ROD quality over last year's RODs and discusses several trends over the past several years. The report concludes with recommendations for strengthening aspects of RODs in the future.

Background

In FY'89, OERR and OWPE performed an analysis of approximately half of the FY'88 RODs. The analysis focused on whether RODs adequately documented remedy selection decisions in a clear, defensible manner consistent with established guidance. The analysis provided Headquarters and Regional management with a tool to gauge past performance and aided in establishing goals for strengthening future performance.

As part of our ongoing effort to promote continuous improvement in ROD quality and consistency, OERR and OWPE undertook a review of RODs signed during FY'89. This year's review revisited some of the areas covered in last year's analysis, particularly the quality of documentation and its consistency with the "Guidance on Preparing Superfund Decision Documents" (OSWER Directive 9355.3-02, June, 1989) (known as the "ROD Guidance"). In addition, this year's review examined the consistency of remedy selection decisions with the Superfund program's expectations regarding the appropriate use of treatment, engineering controls and institutional controls for source control actions. Additionally, the study evaluated how often innovative technologies are being considered and tested for effectiveness, and the types of remedies being selected for contaminated ground water.

All FY'89 RODs that were entered into CERCLIS, with the exception of four (4) RODs that were not received by Headquarters, were reviewed. The RODs were analyzed by a review team comprised of Headquarters staff and representatives from a Region, and a State. RODs that covered more than one site were counted as one ROD in the analysis, thereby making the total number of RODs analyzed equal to 131.

In the FY'89 ROD analysis, remedial actions were segregated into five categories: final source control actions, interim source control actions, final ground water actions, interim ground water actions, and no action/no further action. A final action is the last action to be taken at/or on a defined portion of the site in order to ensure that protection of human health and the environment has been achieved. Interim actions (e.g., temporary containment or storage, or partial mitigation of media) are those actions that must be followed by a subsequent action (and ROD) in order to achieve definite protection of human health and the environment at that portion of the site. No action/no further action RODs are signed where it is determined that no remedial action (or further remedial action, if a previous action has occurred) is necessary in order to achieve protection of human health and the environment. No action/no further action RODs are also signed in the unusual cases where a determination is made that there is no CERCLA authority to take a particular action (e.g., petroleum) or where no effective action is possible at the site. While no action/no further action RODs will not call for any active measures to control exposure (including institutional controls), they may authorize monitoring. [Note: The FY'88 ROD Analysis was not based on a categorization of the RODs.] This segregation was based on the fact that expectations for these different types of decisions and their respective documentation requirements vary.

RODs which contained a source control and a ground water component were evaluated for both actions.[1]

Results of the analysis demonstrate that 72% (94/131) of FY'89 RODs reviewed addressed source control. Ninety percent (90%) (85/94) of these were final source control RODs, and the remaining 10% (9/94) of the source control RODs were for interim source control actions. Forty-nine percent (49%) (64/131) of the FY'89 RODs addressed ground water remediation. Eighty-four percent (84%) (54/64) of these RODs were final ground water RODs and the remaining 16% (10/64) of the ground water RODs select interim ground water actions. Twelve RODs (9% of the total RODs) were no action/no further action RODs. (See Exhibit 1.)

Objective

The objective of the FY'89 ROD Analysis is to promote ROD quality and consistency by implementing an annual quality assurance/quality control (QA/QC) review of RODs.

Findings of Analysis

Results of the FY'89 ROD Analysis relate to: 1) Consistency of Remedies with Program Expectations, 2) ROD Documentation, and 3) Trends in Remedy Selection over time. The final sections of this report summarize the major findings of the study (including significant improvements made since FY'88) and highlight recommendations for FY'90 RODs.

CONSISTENCY WITH PROGRAM EXPECTATIONS

The goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste. The program expectations state that treatment is most likely to be appropriate for materials that comprise the principal threats posed by a site, and that engineering controls are most likely to be appropriate for materials that pose a low-level threat or where treatment is impracticable. Institutional controls are expected to be used to mitigate short-term impacts and/or as a supplement to the engineering controls to aid in the long-term management of materials that will remain on-site. Institutional controls should not substitute for more active measures as the sole remedy unless active measures are impracticable. Innovative technologies are to be evaluated closely where there is a

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[1] No Action/No Further Action decisions for a portion of the site (e.g., ground water) contained in RODs that authorize remedial action for another portion of the site (e.g., source area) have not been counted in the total of no action RODs.

reasonable belief that they may perform as well or better than conventional technologies with respect to reduction of toxicity, mobility or volume, short-term impacts, or cost. Ground water is to be returned to its beneficial uses within a reasonable timeframe given particular site circumstances. All final Superfund remedial actions are expected to be consistent with the program goal and expectations described in the National Contingency Plan (NCP) unless an exceptional circumstance exists.

Major Findings: Materials comprising principal threats posed by sites are being treated in the vast majority of final source control RODs. Engineering controls are being selected for materials comprising low-level threats in most cases, although low-level threats are being treated in some final source control RODs. The selection of treatment as part of final source control remedies has increased since last year; selection of innovative treatment technologies has also increased. Treatability studies are often planned for remedial design rather than during the remedial investigation and innovative technologies are sometimes eliminated when treatability studies have not been conducted or planned prior to the ROD.

Institutional controls are being used consistently as supplements to final ground water actions and as supplements to engineering controls used for long-term management in the majority of final source control RODs that will leave materials on-site to be managed. Ground water remedies are completely consistent with program expectations to restore ground waters to their beneficial uses within timeframes that are reasonable given particular site circumstances.

Statistics were compiled and examined to determine the frequency of the use of treatment and containment in the FY'89 RODs.[2] (See Exhibit 2.) Treatment was selected as a major component of 73% (69/95) of the final source control remedies. Containment was selected as the sole remedy in the remaining 27% (26/95) of the final source control RODs. These sites that selected containment were large landfills, mining waste/smelter sites or asbestos sites. Treatment was also selected in 70% (7/10) of interim source control RODs. Active restoration was

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[2] Two discrete ROD universes were used in compiling data for this report. The statistics on treatment types and frequencies presented in the noted paragraph (and in the final section of this report on treatment trends) were not based on the FY'89 ROD Analysis data. The data was extracted from the draft FY'89 ROD Annual Report, which reflects all 143 FY'89 RODs entered into CERCLIS. RODs that covered multiple sites were counted as multiple RODs in the ROD Annual Report.

selected in 97% (62/64) of the final ground water RODs and in 50% (5/10) of the interim ground water RODs.

Evaluating consistency of remedies with the program expectations depends on the availability of information in the ROD that clearly identifies contaminant concentrations, their volumes, and location at the site.[3] All of the final source control RODs that identified principal threats (59 RODs) also identified that the material comprising the principal threats posed by the site will be treated (see Exhibit 3). Waste defined as comprising a low-level threat (72 RODs) will be treated in 33% (24/72) of the cases; all 24 of these cases also involve treatment of principal threats. [Note: Treatment of both principal and low-level threats at these sites may be the cost-effective remedy.] Low-level waste will clearly be contained in the remaining 67% (48/72) of the cases. Fifty-eight percent (58%) of the final source control RODs and 72% of the final ground water RODs included the use of institutional controls as part of the remedy. In all but one final source control remedy and one final ground water ROD, in which active response measures are impracticable, these controls are to be used as a supplement to the treatment and/or engineering controls.

Forty-four (44) innovative technologies[4] (defined as source treatment technologies other than incineration or solidification/stabilization and standard ground water treatment methods such as granular activated carbon and air stripping) were selected for thirty-nine (39) source control RODs and six (6) innovative technologies were selected for ground water (see Exhibit 4). Final ground water remediation was selected in 97% (64/74) of the RODs that included a ground water remediation component, 97% (62/64) of which used treatment to address the ground water contamination (see Exhibit 2). The remaining 3% (2/64) of the final ground water RODs used other methods: one selected natural attenuation and the other selected use of an alternate water supply and monitoring. Interim ground water remediation was selected in 14% (10/73) of the ground water RODs, 50% (5/10) of which used treatment. The remaining 5 interim ground water RODs selected natural attenuation (for 1 ROD) and other methods including enhancement of existing pump and treat systems, establishing ACLs, and use of institutional controls.

Innovative technologies were considered in 13 additional final source control RODs, but were not favored due to uncertainty about effectiveness and the lack of data on the innovative technologies. Treatability studies were completed prior to ROD

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[3] The ROD Analysis data base was used to evaluate these findings.

[4] See Footnote 2.

signature to evaluate eleven (11) of the sixty-four (64) final source control treatment remedies and three (3) of the fifty (50) final ground water treatment remedies. Thirty-six (36) additional treatability studies for final source control actions are planned for completion during the remedial design phase. (Note: Treatability studies were not evaluated in ground water RODs.)

Timeframes for restoration and cleanup levels which can be attained for ground water may be uncertain at the completion of the RI/FS. A discussion of this uncertainty was provided in 53% of the final ground water RODs that selected active restoration. In 59% of these RODs that included a discussion of uncertainty, the action taken to reduce this uncertainty was to collect appropriate data to assess the potential performance of extraction and treatment technologies.

ROD DOCUMENTATION

Definition of Principal Threats and Low-Level Threats

The manner in which the ROD defined principal and low-level threats in terms of concentrations and volumes was examined closely. A clear definition of principal versus low-level threats is necessary for measuring the consistency of remedies with the program expectations to treat principal threats whenever practicable and to use engineering controls when waste poses a low, long-term threat or where treatment is impracticable. In order to make this determination, contaminant concentrations and volumes need to be linked to specific areas of the site.

Major Findings: Principal threats are being described relatively clearly. Low-level-threats could be defined more clearly.

For sites that included discrete areas thought to comprise the principal threats posed by the site, approximately 80% (59/74) of the final source control RODs clearly defined the principal threats at the site and all of these RODs provided both the volumes and concentrations of the contaminants in these areas. Forty-nine percent (49%) (35/72) of the final source control RODs with areas that pose a low-level threat defined and identified the contaminants in these areas, and about 60% of the descriptions included the volume of this contaminated material.

Documentation of Site Risks

Major Findings: Documentation of site risks is the priority area for improvement.

All RODs for final actions should summarize the results of the baseline risk assessment conducted for the site, including the

results of the exposure and toxicity assessments and the pathway-specific risks. The ROD should clearly identify both the carcinogenic and noncarcinogenic risks for the populations at risk at the site.

The ROD should clearly define current and future expected land use scenarios and the reasonable exposure pathways affecting each population group identified. Environmental risks should also be summarized. While nearly all of the final source control and the final ground water RODs identified the current land use and the reasonable exposure pathways affecting the population groups, 38% of the final source control RODs provided future land use. Nearly all of the final ground water RODs identified the potential beneficial use of the ground water. Basic toxicity information about the contaminants, daily intake factors, and assumptions regarding the intake were identified in less than half of the final action RODs.

Populations at risk[5] were identified in 72% and 83% of the final source control and final ground water RODs, respectively (see Exhibit 5). Fifty-four percent (54%) of the final source control RODs provided the carcinogenic risk or hazard indices for the pathway-specific risks and for the population groups at risk at the site. Only 43% of the final ground water RODs provided the total risks for the population at risk and 67% provided pathway-specific risks.

Approximately 66% of the final source control RODs and 72% of the final ground water RODs specifically documented that the baseline risk was greater than the carcinogenic risk range. Several RODs did not clearly explain the relationship of the baseline risk to the risk range. Forty-four percent (44%) of the final source control RODs and 56% of the final ground water RODs documented potential environmental exposures.

The summary of site risks section of the ROD should state that imminent and substantial endangerment to public health, welfare, or, the environment may occur if no action is taken at the site. While this statement appeared in the declaration of 53% of the final source control RODs, only 27% included it in the risks summary also. (Note: Ground water RODs were not reviewed for these statements.)

In the description of alternatives section, the ROD should clearly define all the risks and exposure pathways existing at a site, and should explain how the selected remedy addresses the

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[5] Populations at risk refers to a group of individuals potentially exposed at Superfund sites, based on current or future land use under reasonable maximum exposure assumptions.

risks. Only 28% of the final source control RODs included a description of initial risks for a pathway or population and 46% provided the risk reduction for each alternative. However, in the comparative analysis sections of the source control and ground water RODs, about 75% of the RODs provided this information under the discussion of "overall protection" as well as in the statutory determinations section of the ROD under the "Protection of Human Health and the Environment" determination. Forty-four percent (44%) of the final source control RODs provided risk levels corresponding to concentration-based remediation goals in the description of the selected remedy.

Alternatives Description and Analysis

Major Finding: Improvement over last year was seen in use of the nine criteria in the comparative analysis.

The description of each alternative should allow the reader of the ROD to fully track all waste identified on the site to its final destination, including residuals. Sixty-six percent (66%) of the final source control RODs and 63% of the final ground water RODs provided such a description of the alternatives (see Exhibit 6). About half of the final ground water RODs that selected active restoration identified the area of attainment and the provisions for monitoring the ground water once the system is shut off to ensure remediation levels are maintained.

The ROD should highlight the key differences in the alternatives in relation to the nine criteria. Eighty-six percent (86)% of the final source control RODs and 91% of the final ground water RODs provided a comparative analysis that used the nine criteria consistent with NCP definitions, compared to 80% last year. Several final action RODs did not provide a comparative analysis of alternatives.

ARARs Identification (Land Disposal Restrictions, RCRA Waste Documentation, Closure, Endangered Species Act, State ARARs)

Major Findings: Improvement is needed in documenting a determination of whether wastes at the site are RCRA wastes, whether LDR is an ARAR, and whether RCRA closure requirements are ARARs. State ARARs are being addressed most of the time. Describing the ARARs that are actually to be attained needs to be improved.

Key ARARs were documented in 52% of the final source control RODs in the description of the alternatives, compared to 70% of the 75 RODs reviewed last year (see Exhibit 6). Several ARARs in particular, listed above, were highlighted in this year's analysis. Forty-nine percent (49%) of the final source control RODs documented whether the waste is a RCRA waste and provided a determination of the Land Disposal Restrictions (LDR) as an ARAR;

forty-three percent (43%) of the final ground water RODs provided this documentation and determination. RCRA closure requirements were documented as ARARs for approximately half of the actions that involved capping, excavation or disposal. Approximately 25% of the sites with final source control actions where endangered species may be encountered identified the Endangered Species Act as an ARAR. State ARARs were addressed in 86% and 83% of the final source control and final ground water RODs, respectively. In the comparative analysis of alternatives, 73% and 78% of the final source control and final ground water RODs, respectively, highlighted that each alternative meets ARARs. Ninety-three percent (93%) of the final source control RODs documented the statutory determination that the selected remedy complies with ARARs, and about 85% of the ground water RODs provided this statement; however only about 70% of the final action RODs listed and described the ARARs that would be attained.

Selected Remedy

Major Findings: Remediation goals and points of compliance need to be documented more clearly.

The description of the selected remedy should provide the remediation goals and the points of compliance for each medium or area at the site that is being addressed. Sixty-two percent (62%) of the final source control RODs provided remediation goals and 33% specified the points of compliance for each medium (see Exhibit 6). Less than half (48%) of the final source control RODs documented the method for managing residuals. The final ground water RODs provided remediation goals 87% of the time.

Statutory Determinations and Rationale for Remedy Selection

Major Findings: There is a marked improvement over last year in providing clear rationales for the remedy selection in terms of the five primary balancing criteria.

All RODs must provide a description of how the selected remedy satisfies each of the four statutory requirements for remedial actions and the preference for treatment. The discussion under "utilization of permanent solutions and treatment to the maximum extent practicable" is where the rationale is to be found. Seventy-one percent (71%) of the final source control RODs (compared to 50% last year) and 37% of the final ground water RODs provided the rationale for remedy selection in terms of a balancing of the five primary balancing criteria (see Exhibit 6).

TRENDS IN REMEDY SELECTION[6]

Use of Treatment

Major Findings: Use of treatment, including innovative treatment technologies, is increasing annually.

An historical overview of FY'87 through FY'89 source control RODs was conducted to compare selected remedies since the enactment of the Superfund Amendments and Reauthorization Act of 1986. This analysis demonstrates that the use of treatment for source control RODs has increased from 54% (27/50) in FY'87, to 69% (69/100) in FY'88, and 72% (76/105) [or 73% (69/95) of final source control RODs] in FY'89. Additionally, the use of innovative treatment technologies in source control RODs that selected treatment has also increased from 26% (7/27) in FY'87, to 40% (28/69) in FY'88, and 51% (39/76) in FY'89. Thus, there has been a progressive increase in the frequency of the use of treatment to address source control, and a twofold increase in the employment of innovative technologies for the treatment selected since FY'87.

Conclusions and Recommendations for FY'90 RODs

In conclusion, we continue to improve in our efforts to produce high-quality RODs. Clarity in the descriptions of remedies and the rationale for selection of a remedy help improve the quality and consistency of RODs and assist in enforcement and negotiation efforts, and in ROD implementation. The results of the analysis show success in improving those areas targeted as a result of last year's ROD Analysis.

Improvement in the FY'90 RODs should be based on the lessons learned from the FY'89 ROD Analysis. Specifically, emphasis should be placed on the following areas:

1) Documentation of site risks;

2) Describing principal and low-level threats;

3) Describing the link between principal and low-level threats and the method of achieving protection in accordance with the Superfund program's expectations;

4) Documentation of ARARs, particularly LDR;

5) Increasing the use of treatability studies conducted during the remedial investigation to support the selection of innovative technologies.

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[6] See Footnote 2.

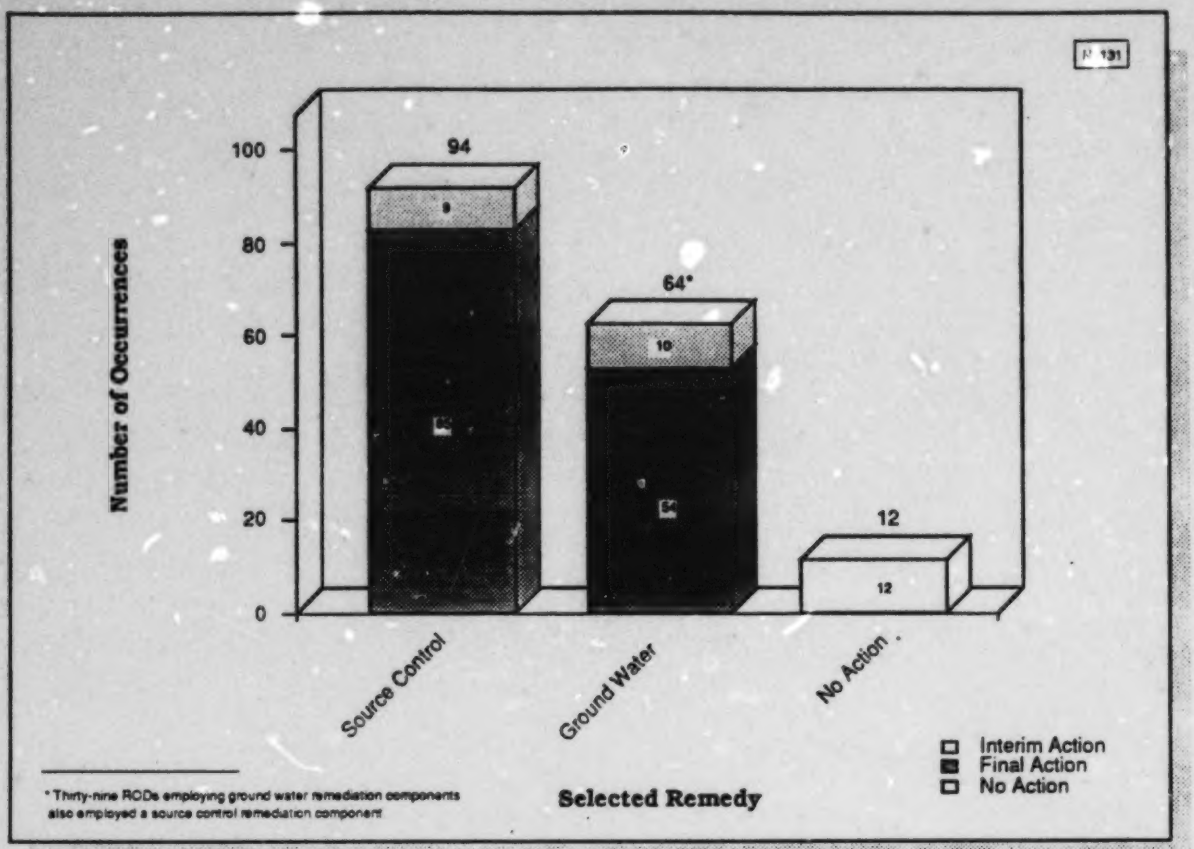
Headquarters will assist Regional efforts to enhance ROD quality through the ROD forums which will be held in each Region during the Third Quarter. At that time we will provide good examples of various sections of the ROD to Remedial Project Managers (RPMs). We will also distribute revised short sheets reflecting the latest guidance and a ROD checklist to be used by RPMs as an additional QA/QC tool.

If you have any questions about the FY'89 ROD Analysis, please contact Sandra Panetta in the Remedial Operations and Guidance Branch, Hazardous Site Control Division, OERR, at FTS-475-9757.

Attachments

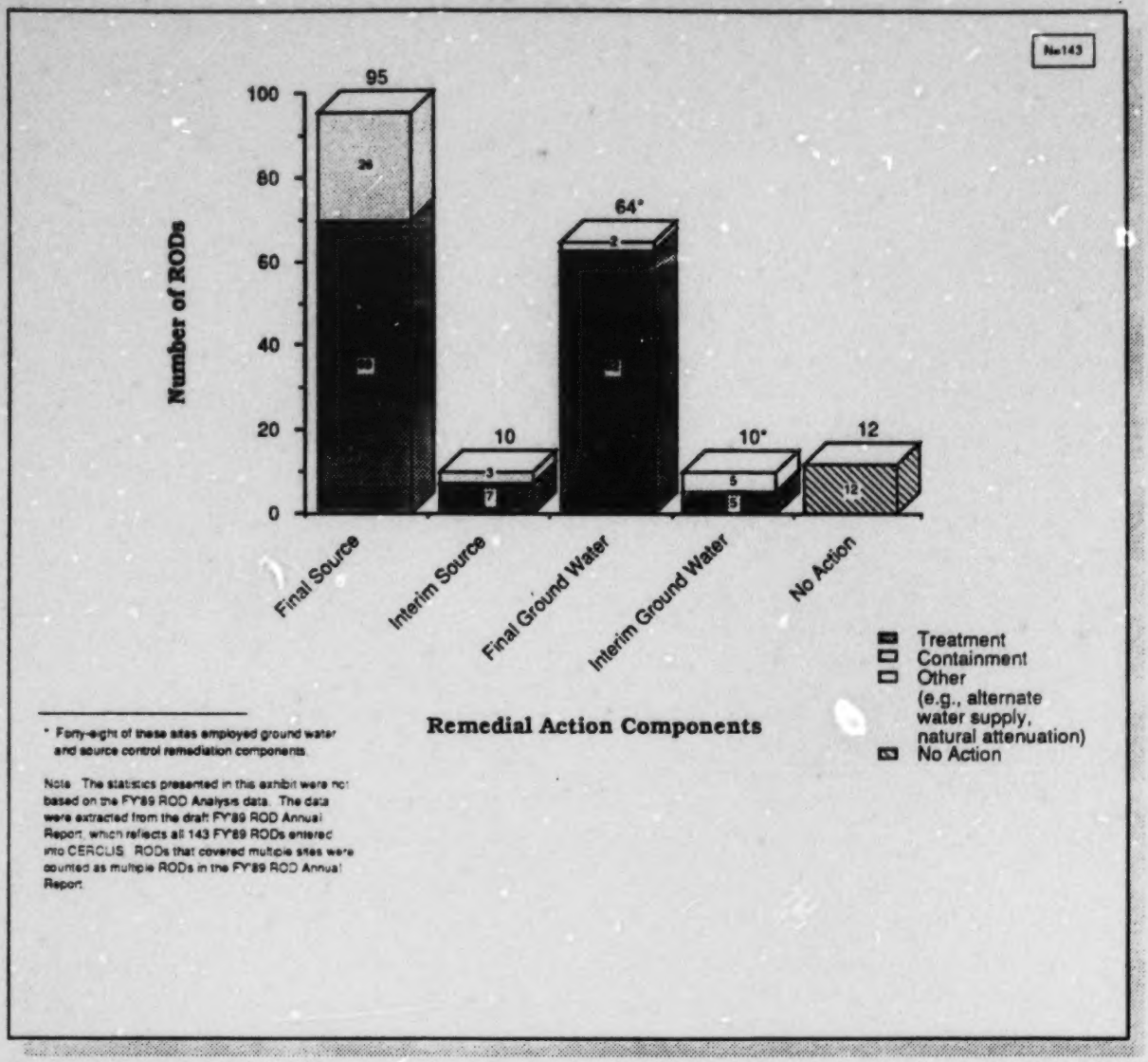
cc: Superfund Branch Chiefs, Regions I-X
Superfund Section Chiefs, Regions I-X
Regional Counsels, Regions I-X
Regional Counsel Superfund Branch Chiefs, Regions I-X

FY'89 RECORD OF DECISION ANALYSIS DATA SUMMARY
Exhibit 1. Final vs. Interim Actions



* Thirty-nine RODs employing ground water remediation components also employed a source control remediation component

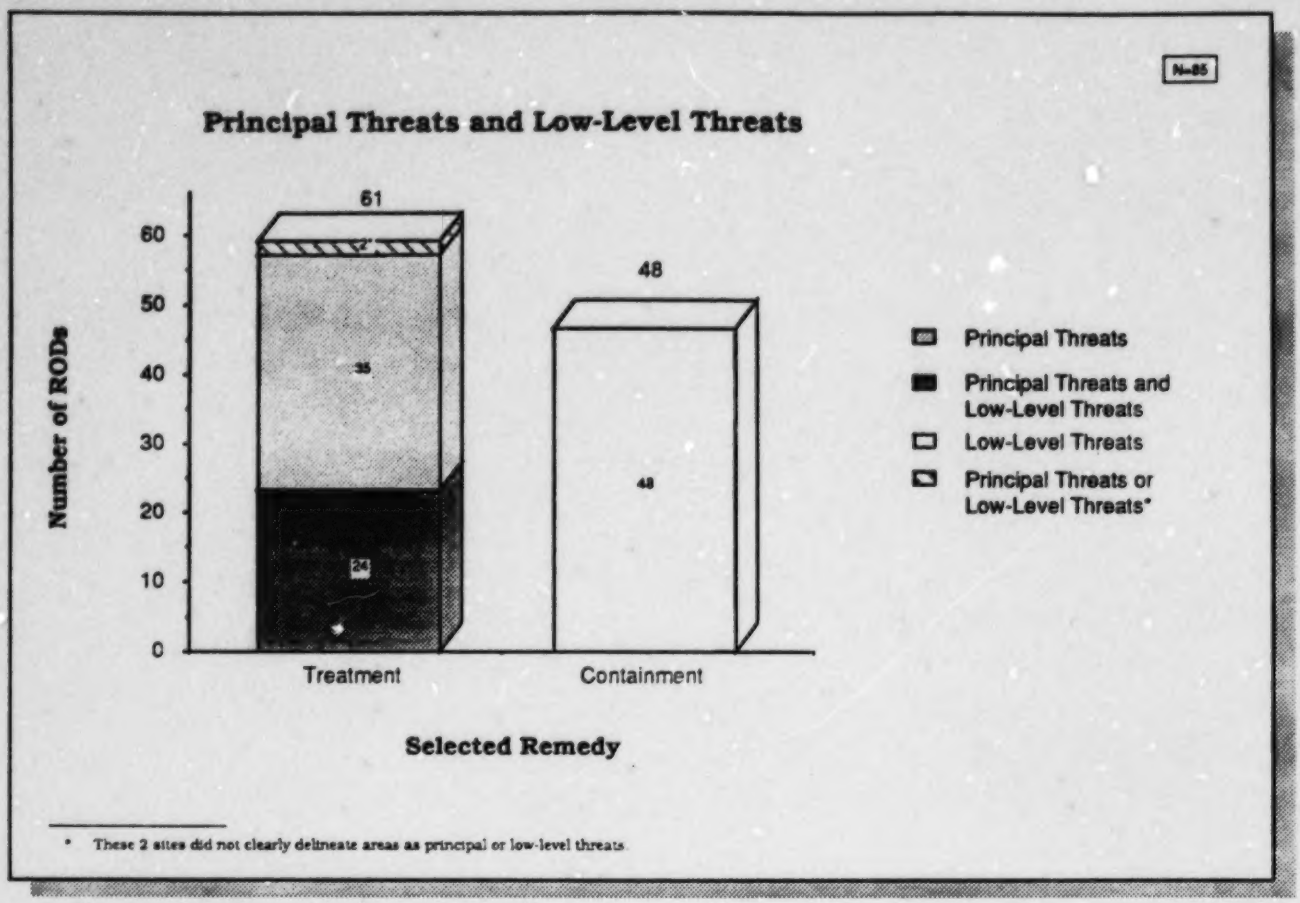
FY'89 RECORD OF DECISION ANNUAL REPORT DATA SUMMARY
Exhibit 2. Treatment vs. Containment



* Forty-eight of these sites employed ground water and source control remediation components.

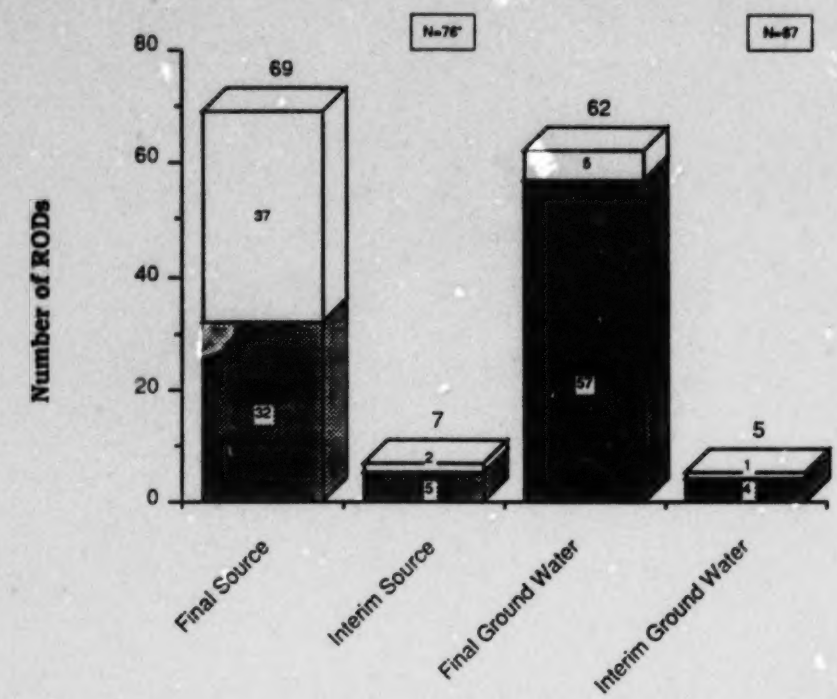
Note: The statistics presented in this exhibit were not based on the FY'89 ROD Analysis data. The data were extracted from the draft FY'89 ROD Annual Report, which reflects all 143 FY'89 RODs entered into CERCLIS. RODs that covered multiple sites were counted as multiple RODs in the FY'89 ROD Annual Report.

FY'89 RECORD OF DECISION ANALYSIS DATA SUMMARY
Exhibit 3. Treatment vs. Containment of Principal Threats and Low-Level Threats in Final Source Control RODs



* These 2 sites did not clearly delineate areas as principal or low-level threats

FY'89 RECORD OF DECISION ANNUAL REPORT DATA SUMMARY
Exhibit 4. Innovative vs. Conventional Treatment Technologies



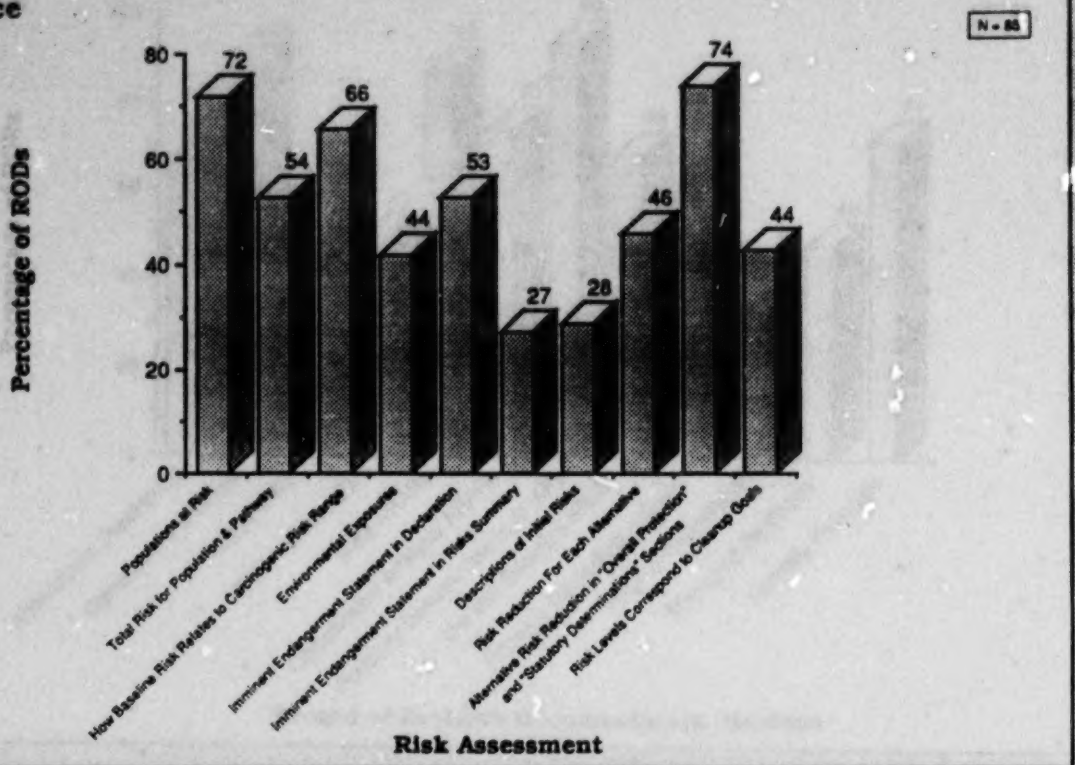
* These 76 RODs employed 100 source control treatments.

Note: The statistics presented in this exhibit were not based on the FY'89 ROD Analysis data. The data were extracted from the draft FY'89 ROD Annual Report, which reflects all 143 FY'89 RODs entered into CERCLIS. RODs that covered multiple sites were counted as multiple RODs in the FY'89 ROD Annual Report.

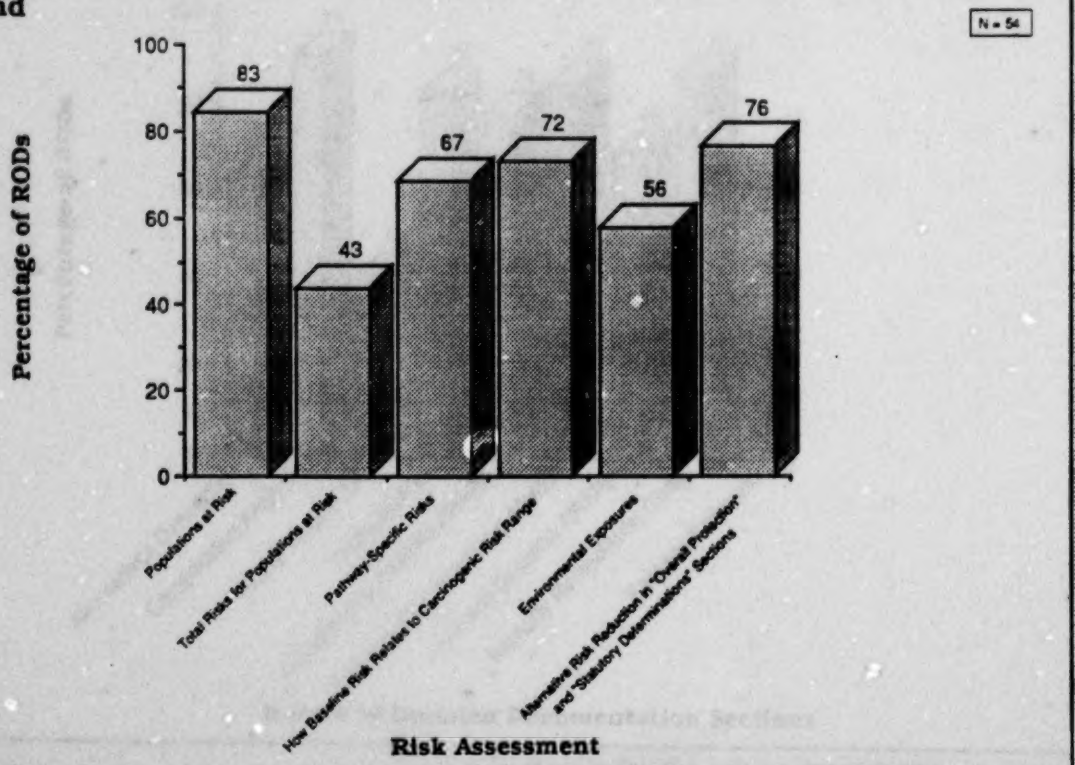
FY'89 RECORD OF DECISION ANALYSIS DATA SUMMARY

Exhibit 5. Documentation of Risks at Final Source and Final Ground Water RODs

Final Source Control:

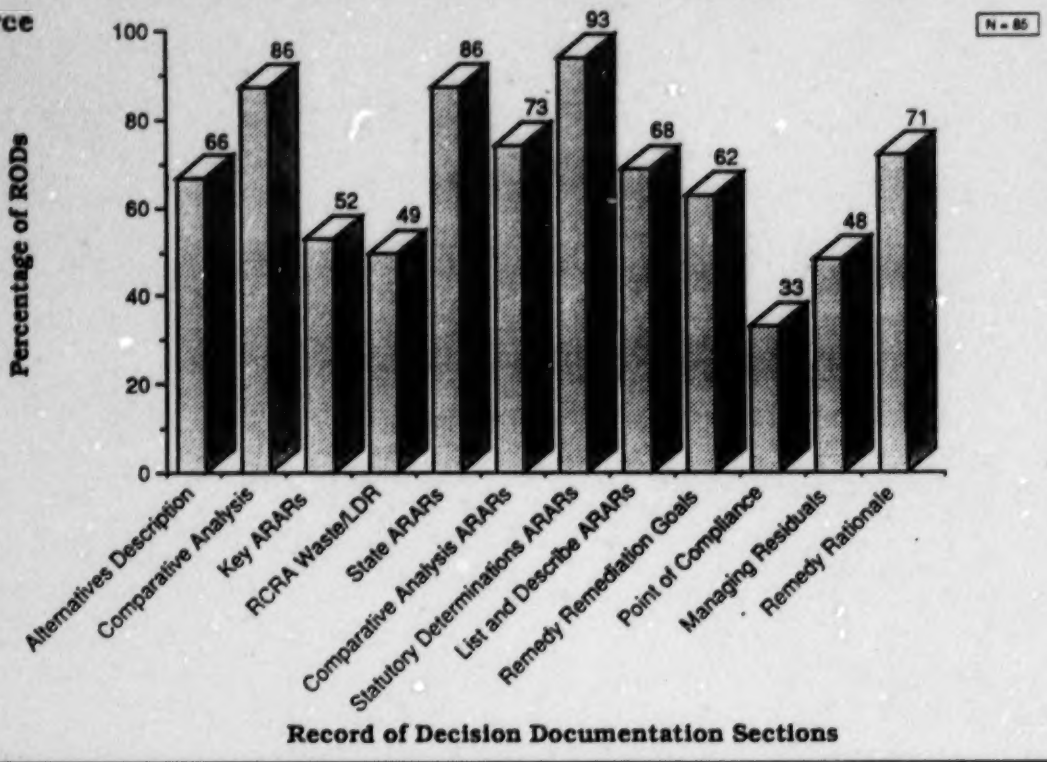


Final Ground Water:



FY'89 RECORD OF DECISION ANALYSIS DATA SUMMARY
Exhibit 6. Documentation Findings

Final Source Control:



Final Ground Water: